Total No. of Questions : 8]

SEAT No. :

PB-3981

[Total No. of Pages : 3

[6262]-324

T.E. (Robotics & Automation Engineering)

ROBOT PROGRAMMING

(2019 Pattern) (Semester - II) (311508(A))

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat labelled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***
5) ***Use of logarithmic table, slide rule is electronic pocket calculator is allower.***

Q1) a) Differentiate between the command structure of VAL-I and VAL-II language in Robot Programming. **[8]**

b) Explain various monitor command instructions used in VAL-Il. **[9]**

OR

Q2) a) Develop a program using VAL II robot programming language for a PUMA 560 robot when setting input signal at 25th port of controller it unloads a cylindrical part of 10mm diameter, from Machine l positioned at point P1 with coordinates (150,250,0) mm and orientation (0,90,0)° and load the part on Machin2 positioned at P2 with coordinates(150,250,50)mm and orientation (0,90,0)°. The speed of robot motion is 20 in./s. However, because of safety precautions, the speed is reduced to 10 in./s while moving to a machine for an unloading or loading operation. **[9]**

b) Explain the following instruction in VAL-II with example: **[8]**

i) ABORT

ii) EXECUTE

iii) DO

iv) RETRY

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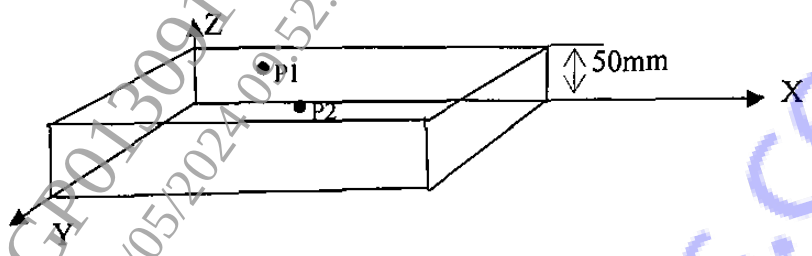
Q3) a) Develop a program using RAPID robot programming language using RAPID procedure for drilling operation from point P1(200,200,50) to P2(400,350,50) such that both the holes are of 5mm diameter and with depth of 50mm. While executing the program the orientation of end effector remains same as (0,90,0)°. **[9]**



b) Explain the following instruction in RAPID with example: **[9]**

i) GripLoad

ii) SetAO

iii) MoveC

iv) ISignalDO

v) WaitDO

vi) CONNECT

OR

Q4) a) Explain the Position Instructions and Input/Signal Instructions in RAPID with the help of examples of programs. **[9]**

b) Define Data types. Explain any four data type used in RAPID with the help of examples of programs. **[9]**

Q5) a) Explain the following instruction in AML with example: **[9]**

i) AMOVE

ii) DMOVE

iii) EOD

iv) QMONITOR

v) ERASE

vi) PRINT

b) Explain the following code & output when executed in AML: **[9]**

i) MONITOR (LED, 2, 0, 0, 1.5, 'passed');
MOVE (ARM, fgoal, LED);

ii) ATTN: SUBR;
MOTPARMS: NEW STOPMOVE;
WAITMOVE;
BREAK (EOL, 'ATTENTION REQUESTED');
APPLY ('AMOVE', MOTPARMS);
END;

iii) DMOVE(<4, 5, 6>, <30, –60, 90>);

iv) SPEED (0.8)

OR

Q6) a) Explain sensor instructions in detail with examples used in AML. **[9]**

b) Explain motion controls used in AML. **[9]**

Q7) a) Explain the methods of detecting possible collision of robots and what are the features added to avoid it. **[9]**

b) Write a short note on "Robot Economics". **[8]**

OR

Q8) a) Explain the process of repeatability measurement of robot. **[9]**

b) Write a short note on "Multiple robot and machine Interferences". **[8]**

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